"The How" of General Systems: Analogical, Abductive, Retroductive

Since the 1950s, research on a general theory of systems (GST) has been at the core of what is now the International Society for the Systems Sciences. Engaging with this research, I propose a first principle that a general theory of systems must account for the theorizer of general systems. The science must explain the scientist, the design include the designer. To paraphrase Warren McCulloch: What is a GST that a person might know it? And what is a person that one might know a GST? I call this recursive approach "the how" of general systems, and my version of it begins with an examination of human processes, that is, of how humans operate or function so as to create GSTs.

Corollarily, this recursivity is indicative of the form of the GST. Perhaps this form is holonic, its systemness simultaneously part and whole, or it manifests nested characteristics, such as identity, integrity, or tensegrity. Perhaps a recursive form marks a deeper reciprocity among systems. Several current GST candidates exhibit this recursive form.

Herein, I explore the how of general systems as pointing to processes of analogy, abduction, and retroduction. To pursue this inquiry is to grapple with conceptual histories, for just as abduction and retroduction do not ensure logical validity, both the rhyming pattern (deduction, induction, abduction, retroduction) and syllogistic pattern (major premise, minor premise, conclusion) can be misleading. Moreover, unlike Peirce's frequently interchangeable usage, abduction and retroduction are now often differentiated, amidst a broader and ongoing whirlwind of theoretical and taxonomic development.

Like many systems scholars, my methods rely on visual thinking, and I develop a simple figure informed by orientational metaphors. This figure centers analogy, which Robert Rosen described as fundamental to general systems and which I likewise take as pivotal. With regard to abduction, a recursive lens pinpoints Gregory Bateson's view: abduction as a biological and ecological process, rather than merely a form of human reasoning. Meanwhile, a retroductive analysis, which has been used to formalize a critical realist worldview, might advance discussions of isomorphic systems processes. In sum, this talk sheds light on two possible pathways to-and-from a GST, one based on abductive or eco-cognitive processes and another on a retroductive-abductive consideration of isomorphisms.